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(54) FEED CONVEYOR FOR LOOSE MATERIALS

(71) I, CAMILLO PIROVANO an Italian Citizen of Via Spluga — Cernusco Lombardone (Como), Italy, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a feed conveyor for loose materials.

Feed conveyors are known comprising a plurality of scraper blades formed integrally on a flexible cable. Such feed conveyors are much used for example in installations for conveying granular food to a large number of animals, these installations consisting mainly of a continuous pipe, a continuous feed conveyor disposed in the pipe to feed the food through the pipe, a mechanism for driving the feed conveyor along the pipe, and supply and discharge points associated with the pipe. Examples of such installations are described in U.K. Patent Specification No. 1,393,951, the contents of which are incorporated herein for reference purposes. During the operation of such installations, as the feed conveyors are driven in an endless circuit they are necessarily subjected to bending when turning about corners, pulleys and the like. Consequently, one of the problems associated with these feed conveyors is that due to the stress on the cable generated by such constant bending, which gives rise to frequent cable breakage. Consequently, one object of the present invention is to reduce the frequency of such breakages in the cable.

According to the invention this object is attained by a feed conveyor for loose materials, of the type in which a plurality of radially projecting scraper blades are formed on a flexible feed cable, said blades being equidistant one from the other, each blade having a central portion and a pair of tubular sleeve elements, said sleeve elements extending axially along said feed cable from both sides of said central portion, said blades being interspaced so as to leave a length of bare cable between facing tubular sleeve elements of adjacent blades, wherein the sum of the lengths of said facing tubular sleeve elements and one half of the thickness of each associated central portion is greater than said length of bare cable therebetween.

Such an arrangement serves to distribute the stress in the cable more uniformly over the entire length of its bare portion when the cable assumes a flexed position. Furthermore, the tubular sleeve elements can be such as to flex with the cable, thus to enable that portion of the cable covered by the tubular elements to bend when the bare portion of the cable close to it is flexed, so as to further distribute the stress in said cable.

Further characteristics and advantages will be more evident from the description given hereinafter and from the accompanying drawings of a preferred embodiment of the feed conveyor according to the present invention. In the drawings:

Figure 1 is a partially sectional elevation illustrating part of a feed conveyor incorporating the present invention;

Figure 2 is an elevation illustrating the operation of a feed conveyor constructed in accordance with the known art, in its passage about a toothed drive wheel; and

Figure 3 is a view similar to Figure 2, but illustrating the operation of the feed conveyor according to the present invention.

With reference to the drawings, and in particular to Figure 1, a feed conveyor incorporating the present invention is indicated overall by the reference numeral 10. The feed conveyor 10 includes an endless steel cable 18 and a plurality of scraper blades 12, said scraper blades being formed on said cable 18 and equidistant one from the other. The blades 12 are preferably moulded directly on to the cable.

As shown in Figure 1, each scraper blade 12 preferably comprises a disc-shaped central portion 14 and a pair of preferably truncated conical tubular sleeve elements 16, said sleeve elements extending axially

along the cable 18 from both sides of the central portion 14, and being formed rigidly or integrally therewith. A portion of bare cable 18*a* is provided between each pair of facing tubular sleeve elements 16 of adjacent blades 12. The scraper blades 12 are preferably formed from flexible or resilient plastics, preferably polypropylene, although other plastics may be used. Preferably, all the blades 12 associated with an individual feed conveyor 10 are of identical dimensions.

With reference to Figure 1, for the reason explained in greater detail hereinafter, the dimensions of the preferred feed conveyor 10 of the present invention satisfy the equation A+B>C, where A is equal to the length of the tubular element 16 plus one half the thickness of the central portion 14 of the left-hand blade 12, B is equal to the length of the tubular sleeve element 16 plus one half the width of the central portion 14 of the right-hand blade 12, and C is the length of the bare cable 18*a* between the adjacent blades. In the preferred case, as shown in Figure 1, in which all the blades 12 have the same dimensions (i.e. A=B), said equation becomes simplified to 2A>C.

With reference to Figures 2 and 3, these show the feed conveyor 10 according to the present invention and a feed conveyor 10' of the known art, these being driven about a circular toothed drive wheel 20. As shown, the wheel 20 comprises a plurality of teeth or notches 22, the pitch of the teeth 22 being equal to the interspace between the blades 12 (12'). This is described in greater detail in the said U.K. Patent Specification No. 1,393,951 to which reference should be made.

Referring now to the feed conveyor 10' of the known art shown in Fig. 2, this comprises a flexible cable 18', generally of the stranded type, and a plurality of interspaced blades 12', generally moulded on the cable 18'. The blades 12' differ from the blades 12 of the present invention in two important aspects. Firstly, the sleeve elements 16' are very short relative to the sleeve elements 16 of the present invention, and they are of a considerably larger diameter. Both these differences make the sleeve element 16' much more rigid than the sleeve element 16. For this reason, when the cable 18' extends about a curved portion, such as the toothed wheel 20, the points of greatest stress in the cable 18' are the points 24', the stress in the cable 18' at these points being very high. A large part of the portion 18' of the cable does not bend (and consequently remains unstressed), the points 24' providing all the flexion necessary for the pitch length. In this manner, any cable breakage is observed with greatest frequency at the points 24'.

Referring now to Figure 3, this shows the feed conveyor 10 of the present invention, in which the support distances for facing tubular elements 16 of adjacent blades 12 and the length of the bare cable between them satisfy the relationship A+B>C. Because of the extended length of the support distances of the facing tubular sleeve elements 16, the reduction in their thickness with a resultant increase in their yieldability or flexibility, and the reduced length of the bare cable 18a between them, the degree of curvature at the points 24 is reduced, the curvature of the cable 18 being more uniformly distributed over the entire bare portion 18a of the cable 18, and over that portion of the cable 18 covered by the facing elements 16. Consequently, the stress in the cable 18 at the points 24 is reduced, giving rise to a corresponding reduction in the frequency of cable breakage.

Referring again to Figure 1, the dimensions of a feed conveyor incorporating the present invention are as follows: the diameter of the truncated vertex of the truncated conical element 16 is a 6 mm; the base diameter of the element 16 is 9.5 mm; the length of the element 16 is 12.75 mm; the width of the central portion 14 of the element 12 is 4.5 mm; the diameter of the central portion 14 is 29.5 mm; the angle of elevation of the side walls 13 of the central portion 12 is 5°; the radius of curvature at the point of intersection of the base of the element 14 with the side walls 13 is 1.5 mm; the diameter of the cable 18 is 5 mm; and the pitch of the blades 12 is 50.265 mm. These dimensions are one example of a range of dimensions which satisfy the desired characteristics. Evidently, other sets of dimensions may be used.

Although one preferred embodiment of the present invention has been illustrated and described, together with suggested modifications thereto, further modifications may be made within the scope of the following claims.

WHAT I CLAIM IS:—

1. A feed conveyor for loose materials, of the type in which a plurality of radially projecting scraper blades are formed on a flexible feed cable, said blades being equidistant one from the other, each blade having a central portion and a pair of tubular sleeve elements, said sleeve elements extending axially along said feed cable from both sides of said central portion, said blades being interspaced so as to leave a length of bare cable between facing tubular sleeve elements of adjacent blades, wherein the sum of the lengths of said facing tubular sleeve elements and one half of the thickness of each associated

central portion is greater than said length of bare cable therebetween.

2. A feed conveyor as claimed in Claim 1, wherein said tubular sleeve elements are pliable with said cable.

3. A feed conveyor as claimed in Claim 1, wherein the dimensions of each of said scraper blades are substantially identical.

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Fig.1

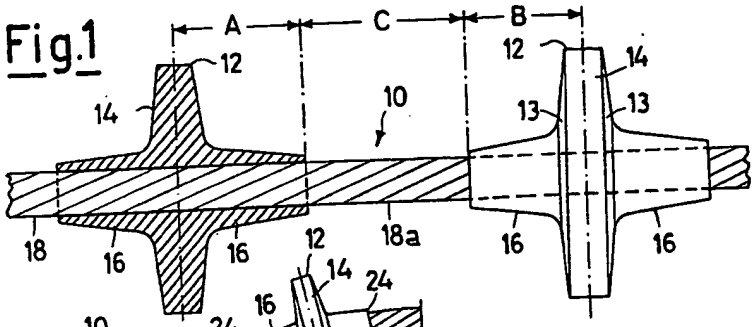

Fig.3

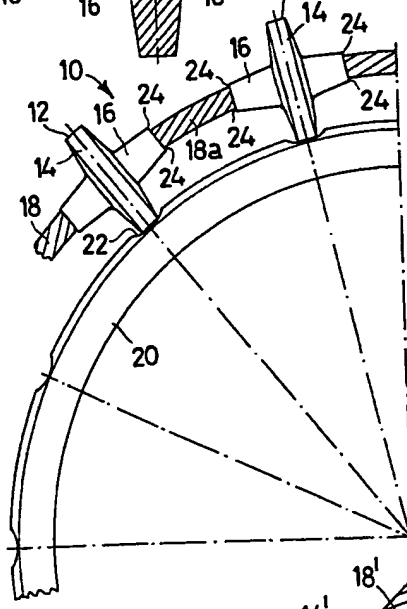

Fig.2